



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/811,057	03/26/2004	Thomas W. Sederberg	22477	9540
20551	7590	11/25/2005		
THORPE NORTH & WESTERN, LLP. 8180 SOUTH 700 EAST, SUITE 200 SANDY, UT 84070				
			EXAMINER PAPPAS, PETER	
			ART UNIT 2671	PAPER NUMBER

DATE MAILED: 11/25/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/811,057

Applicant(s)

SEDERBERG, THOMAS W.

Examiner

Peter-Anthony Pappas

Art Unit

2671

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 September 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 12-17 is/are allowed.
- 6) ☒ Claim(s) 1-4, 7-11, 18-20 and 22 is/are rejected.
- 7) ☒ Claim(s) 5, 6 and 21 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- ☒ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____.

DETAILED ACTION

Allowable Subject Matter

1. Claims 5-6 and 21 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.
2. Claims 12-17 are allowed.
3. In regards to claims 12-17 the prior art of reject fails to teach or suggest inserting a T-junction into the cubic spline control mesh; inferring knot vectors for the T-junction; and defining basis functions for the T-junction using the knot vectors. It is noted that Baknov teaches said steps, but for a bicubic spline control mesh and not a cubic spline control mesh (see the rejection for claims 9-10 below).

Claim Objections

4. Claim 19 is objected to because of the following informalities: There are duplicate claims labeled claim 19. The second claim 19 is thus considered claim 20, original claim 20 is now considered claim 21 and original claim 21 is now considered claim 22. Appropriate correction is required.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1-4, 7-11, 18-20 and 22 are rejected under 35 U.S.C. 102(b) as being anticipate by Bakenov (T-Splines: Tensor Product B-Spline Surfaces with T-Junctions).

7. In regards to claim 1 the recitation "...defining a bi-cubic spline surface ..." (p. 24, line 1) has not been given patentable weight because the recitation occurs in the preamble. A preamble is generally not accorded any patentable weight where it merely recites the purpose of a process or the intended use of a structure, and where the body of the claim does not depend on the preamble for completeness but, instead, the process steps or structural limitations are able to stand alone. See *In re Hirao*, 535 F.2d 67, 190 USPQ 15 (CCPA 1976) and *Kropa v. Robie*, 187 F.2d 150, 152, 88 USPQ 478, 481 (CCPA 1951).

Bakenov teaches a method for defining a bi-cubic spline surface in a computing environment, comprising the steps of creating a control mesh with a substantially rectangular structure (p. 27, § 2.9, Fig. 2.23); inferring from the control mesh tensor product B-spline surface basis functions (p. 26, § 2.9, Equation 2.8) for each control point (P_{ij}); and computing a surface based on the basis functions and the control mesh (p. 26-28, § 2.9; p. 53-59, § 4.9).

8. In regards to claim 2 Bakenov teaches utilizing a set of non-hierarchical set of rules (p. 32-33, § 3.1). It is noted that the respective claim language comprises open-ended claim language (i.e. comprising – line 1) and thus "...one non-hierarchical set of rules" (line 2) is consider to read on "...at least one non-hierarchical set of rules."

9. In regards to claim 3 the recitation "...locally refining a control mesh of a bi-cubic spline surface..." (p. 24, lines 1-2) has not been given patentable weight because the

recitation occurs in the preamble. A preamble is generally not accorded any patentable weight where it merely recites the purpose of a process or the intended use of a structure, and where the body of the claim does not depend on the preamble for completeness but, instead, the process steps or structural limitations are able to stand alone. See *In re Hirao*, 535 F.2d 67, 190 USPQ 15 (CCPA 1976) and *Kropa v. Robie*, 187 F.2d 150, 152, 88 USPQ 478, 481 (CCPA 1951).

Bakenov teaches a method for locally refining (p. 16, § 2.6, ¶ 2) a control mesh of a bi-cubic spline surface in a computing environment, comprising the steps of defining a control mesh having a substantially rectangular structure; inserting a control point into a pre-image of the control mesh (p. 69-70, Figs. 5.2-5.5); and computing the Cartesian coordinates of the control points and of the neighboring control points (p. 57-58, Step 5) such that the bi-cubic spline surface is not geometrically altered (Abstract, ¶ 1; p. 53-59, § 4.3; p. 65-73, § 5.2).

10. In regards to claim 4 Bakenov teaches splitting basis functions (p. 21-25, § 2.8.1) which have fewer knots than are called for by the control mesh (p. 68, § 5.2, step 2); and adding control points to the control mesh in locations where basis functions have more knots than are called for by the control mesh (p. 68, § 5.2, step 3).

11. In regards to claim 7 see p. 65-73.

12. In regards to claim 8 the recitation "...subdividing control meshes in order to produce local refinement to control meshes of arbitrary topology..." (p. 25, lines 1-2) has not been given patentable weight because the recitation occurs in the preamble. A preamble is generally not accorded any patentable weight where it merely recites the

purpose of a process or the intended use of a structure, and where the body of the claim does not depend on the preamble for completeness but, instead, the process steps or structural limitations are able to stand alone. See *In re Hirao*, 535 F.2d 67, 190 USPQ 15 (CCPA 1976) and *Kropa v. Robie*, 187 F.2d 150, 152, 88 USPQ 478, 481 (CCPA 1951).

Bakenov teaches selecting a region (i.e. extraordinary point at $t=2$) for which local refinement is desired; using T-junction control points to prevent the refinement operation from propagating to the entire surface (Abstract, ¶ 1; p. 16-17, § 2.6).

13. In regards to claim 9 the recitation "...defining bicubic spline surfaces that provides local refinement to control meshes..." (p. 25, lines 1-2) has not been given patentable weight because the recitation occurs in the preamble. A preamble is generally not accorded any patentable weight where it merely recites the purpose of a process or the intended use of a structure, and where the body of the claim does not depend on the preamble for completeness but, instead, the process steps or structural limitations are able to stand alone. See *In re Hirao*, 535 F.2d 67, 190 USPQ 15 (CCPA 1976) and *Kropa v. Robie*, 187 F.2d 150, 152, 88 USPQ 478, 481 (CCPA 1951).

Bakenov teaches defining bicubic spline surfaces that provides local refinement to control meshes in a computing environment (p. 53-59, § 4.3), comprising the steps of specifying knot intervals associated with the spline control mesh; imposing a local knot coordinate system based on the knot interval (p. 18-21, § 2.8); inferring local knot vectors for control points in order to produce basis functions for the control points (p. 5-

6, § 2.1); and inserting a single control point into the control mesh without altering the bicubic spline surface (p. 16, § 2.6, ¶2).

14. In regards to claim 10 Bakenov teaches permitting partial rows of control points terminating in a T-junction (p. 54, § 4.3).

15. In regards to claim 11 Bakenov teaches assigning local knot coordinates to the pre-image of each control point (p. 65-67, § 5.2).

16. In regards to claim 18 Bakenov teaches that for a valid T-mesh, the bicubic T-spline surface consists of a set of bicubic patches. The domain of each patch corresponds to each interior face in the T-mesh after each T-point has been extended over two bays. The main task is now to define an appropriate 4 x 4 mesh for each patch. The basic requirement is that when these T-points are generated from a B-spline surface by knot insertion or knot removal, the T-spline surface should be the same as the original B-spline surface. Therefore our scheme relies heavily on the polar values of the B-spline surface (p. 55-56, § 4.3). Bakenov further teaches choosing the knot interval for the local knot insertion such that pairs of zero knot intervals separate each pair of adjoining domains (p. 33, § 3.1, ¶3).

17. In regards to claims 19-20 see p. 29, § 2.9.1; p. 65-73, § 5.2.

18. In regards to claim 22 the recitation "...defining a locally refineable tensor-product spline surface of any degree..." (p. 27, lines 1-2) has not been given patentable weight because the recitation occurs in the preamble. A preamble is generally not accorded any patentable weight where it merely recites the purpose of a process or the intended use of a structure, and where the body of the claim does not depend on the

Art Unit: 2671

preamble for completeness but, instead, the process steps or structural limitations are able to stand alone. See *In re Hirao*, 535 F.2d 67, 190 USPQ 15 (CCPA 1976) and *Kropa v. Robie*, 187 F.2d 150, 152, 88 USPQ 478, 481 (CCPA 1951).

The rationale disclosed in the rejection of claim 1 is incorporated herein.

Response to Arguments

19. Applicant's arguments have been fully considered, but are not deemed persuasive. See the respective maintained rejections above.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Peter-Anthony Pappas whose telephone number is 571-272-7646. The examiner can normally be reached on M-F 9:00am-5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ulka Chauhan can be reached on 571-272-7782. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Peter-Anthony Pappas

Application/Control Number: 10/811,057
Art Unit: 2671

Page 8

Examiner
Art Unit 2671

PAP


ULKA CHAUHAN
SUPERVISORY PATENT EXAMINER